

Subcl
A3 9. (Amended) A method according to claim 7, wherein the SISO equalisation process of step g) works over the combined Trellis of the recursive inner code and modulation of step c) and the intersymbol interference characteristics of the transmission channel.

REMARKS

A marked-up version of the rewritten paragraph, section and claim are attached hereto.

A new proper abstract has been provided and the error in the disclosure corrected. It is therefor submitted that the specification is no longer objectionable.

Claim 9 has been amended to recite just "intersymbol interference", which is supported by the description (see p. 2, l. 35). It is therefore submitted that claim 9 now conforms to 35 U.S.C. 112, second paragraph.

The technical field of various digital coding and decoding methods is so densely populated with different solutions and suggestions, that it is by no means obvious that one may simply pick one, complement it with another, and get working results. In particular, there is no reason, suggestion, or motivation for a skilled artisan to combine the cited references, see Ex parte Jones 62 USPQ 2d 1206, 1208, as well as the unlikelihood of success if one just does so by random choice.

The patent of Kobayashi mainly deals with a way to utilize artificially created erasures in an iterative decoding procedure. It mentions in passing (e.g. abstract) that the inner coder can be replaced with a digital modulator, but

otherwise Kobayashi has pays only limited attention to the selection of particular codes. If you look at Kobayashi's claims, you see that they cover exclusively the receiving and decoding end of a connection. The designer of a receiver can hardly pay any attention to what selection of codes should be used, because he can only conform the receiver to what selections have been made for the transmitting device.

It is thus very natural that Kobayashi does not contain any motivation for the person skilled in the art to look for improvements in the coding scheme, for example by paying more attention to the nature of an inner code. As the Examiner also admits, Kobayashi fails to anticipate selecting a recursive code as the inner code. Mentioning a "digital modulator" as an alternative to the inner coder does not contain any suggestion about recursivity, because a large majority of digital modulation methods represent memoryless modulation and have thus absolutely nothing to do with recursivity.

In his decoding schemes Kobayashi suggests using hard decision symbols and "erasures" as feedback. This is different than using "extrinsic information" as in the turbo decoding schemes of the present invention, and leads the skilled person further away from using a recursive inner code, because a recursive inner code would explicitly call from a turbo decoding scheme such as in the present invention.

Benedetto does not show anything else than the fact that recursive codes were known at the priority date of the present invention. The applicant does not contest that fact as such, but the applicant is strongly of the opinion that simply because some isolated piece of information exists, it is not obvious

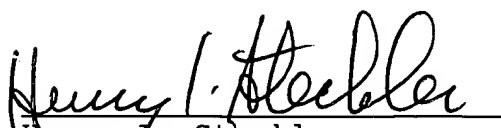
that it can be combined with another piece of information, or that such combination would prove to be successful.

The Examiner is respectfully requested to state, which parts of the cited reference publications could include a reason suggestion, or motivation for the person skilled in the art for their combination, with a reasonable expectation of success as required by Ex parte Jones, supra.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

The Commissioner is hereby authorized to charge payment for any fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,


Henry F. Steckler
Reg. No. 24,139

Oct 25, 2002
Date

PERMAN & GREEN, LLP
425 Post Road
Fairfield, CT 06824
(203) 259-1800 Ext. 119
Customer No.: 2512



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Date: 10/25/02

Signature: Shannon Murphy
Person Making Deposit



Application No.: 09/372,331

Marked Up Specification Replacement Section(s)

[ABSTRACT]

[For transferring digital information in the form of consecutive symbols from a transmitter over a transmission channel susceptible for intersymbol interference to a receiver, the following steps are taken in succession:

- a) encoding the digital information to be transmitted with an outer code (202),
- b) interleaving the encoded digital information to be transmitted (203),
- c) encoding the interleaved encoded digital information with a recursive inner code (204) and in conjunction therewith modulating the encoded interleaved encoded digital information onto a carrier (205),
- d) transmitting the carrier containing the modulated encoded interleaved encoded digital information,
- e) receiving the transmitted carrier containing the modulated encoded interleaved encoded digital information,
- f) producing an estimate of the characteristics of the transmission channel (208),
- g) converting the received carrier into consecutive symbols in a SISO equalisation process using the produced estimate of the characteristics of the transmission channel (209),
- h) deinterleaving the consecutive symbols (210), and
- i) decoding the deinterleaved consecutive symbols in a SISO decoding process (211).]

[Fig. 2]

Abstract of the Disclosure

To reduce intersymbol interference, a system transmitter has an outer encoder, an interleaver for the encoded information, a recursive inner coder, and a modulator coupled to a channel. A receiver has a channel characteristics estimator coupled to the channel, a converter using a SISO equalizer, a deinterleaver and a SISO decoder.



Marked Up Specification Replacement Paragraph(s)

In the system of Fig. 2 [1], the first FSM in the transmitter in the outer encoder 202, designated also as FSM1. The second FSM or FSM2 consists of the recursive inner encoder block 204 and the memoryless modulator block 205. The third FSM or FSM3 is the ISI channel representation 206 and the fourth FSM or FSM4 is a combination of the second FSM and the third FSM. In the receiver the SISO decoder 211 tries to track down the state transitions that have taken place in the outer encoder 202. For doing this it uses its preprogrammed knowledge about the allowed transitions; the preprogrammed knowledge appears in Fig. 2 as the oval block labeled (FSM1). Similarly the SISO equalizer 209 retrieves the operation of the entity formed by the memory block 204 and the memoryless modulator 205, by using the preprogrammed knowledge represented by (FSM2).

**Marked Up Claim(s)**

9. (Amended) A method according to claim 7, wherein the SISO equalisation process of step g) works over the combined Trellis of the recursive inner code and modulation of step c) and the [nonrecursive] intersymbol interference characteristics of the transmission channel.